

EXHIBIT A

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US EPA RECORDS CENTER REGION 5



Subject: Revised Proposal for Electrical Resistance Heating Remediation, Lockformer Facility, Lisle, Illinois

Dear Arthur:

Thermal Remediation Services, Inc. (Thermal) is pleased to provide this revised proposal for remediation using Electrical Resistance Heating (ERH) at the Lockformer Facility located in Lisle, Illinois. This proposal replaces all previous proposals provided by TRS. Treatment goals are to meet the RAOs identified in Table 3.0-1 of the approved Lockformer Work Plan (dated 9/20/02) and to specifically:

- Reduce the concentration of trichloroethene (TCE) in soil to no more than 10 mg/kg at any sample location, and
- Reduce the 95th percentile upper confidence limit (95% UCL) for TCE to no more than 8.9 mg/kg.

Background

Electrical Resistance Heating (ERH) passes an electrical current through the soil and groundwater that requires treatment. The electrical current warms the soil and then boils a portion of the soil moisture into steam. This *in situ* steam generation occurs in all soil types, regardless of permeability. Electrical energy evaporates the target contaminant and provides steam as a carrier gas to sweep the VOCs to the vapor recovery wells (VR wells). After the steam is condensed and the extracted air is cooled to ambient conditions, the VOC vapors are treated using conventional methods.

The type of contaminant and the desired clean-up goal affect the energy, time and cost to remediate a site. However, two subsurface parameters are important: the amount of total organic carbon (TOC) and the presence of heavy hydrocarbons such as diesel, oil, or grease.

TOC preferentially adsorbs VOCs in comparison to water; this is why activated carbon is often used for vapor and water treatment. Thermal typically assumes 0.25% soil TOC unless site-specific information is known. Based on the site information provided by Clayton Group Services, average TOC concentrations in soil are 0.70% and the highest TOC measurement has been 0.89% (measured using the non-carbonate carbon, loss-on-ignition method). Thermal has

accounted for these reported levels of TOC in estimating the ERH operating parameters for the site.

The presence of oil, grease, or other low volatility hydrocarbons can also slow the evaporation rate of VOCs. Raoult's Law describes this effect. There are no heavy hydrocarbons reported in the sub-surface at the Lockformer project site. However, Thermal recommends that the Owner or Owner's agent collect a soil sample from the degreaser area and analyze the sample for TOC, total petroleum hydrocarbons (TPH) – diesel, and TPH – oil and grease prior to installing electrodes in this area.

II. Site Description

The remediation region is located to the west of the Lockformer facility as shown in the attached figure. The treatment volume is about 33,800 yd³. Included in the treatment region is the degreaser area, a 2,660 ft² region that is impacted from 0 to 16 ft bgs.

The geology consists generally of clay in the remediation region. Perched or slow percolating water is common in the remediation region; however the persistent groundwater table is encountered at about 55 ft bgs.

The initial maximum soil concentration of TCE in the ERH remediation region is 3,400 mg/kg.

III. Scope of Work

The basis for our preliminary design, including specific project parameters, is shown in the attached table. These site-specific parameters are also the basis of the costs presented in this proposal. The text below defines the work tasks required to meet the project objectives and to allow review of the ERH remediation costs. These assumptions also describe the division of work between Owner or Owner's agent and Thermal that will be conducted. Nothing in this scope of work includes the recovery of vapors or soil treatment outside, including below, the heated regions.

Permitting and Design

Owner or Owner's agent will apply and pay for all permits. Thermal will provide assistance (up to 8 hours labor and \$100) in obtaining the electrical building permit. The Owner or Owner's agent will be the author of the site Health and Safety Plan and the O&M Plan. Thermal will provide input on the site Health and Safety Plan (up to 8 hours labor). Thermal will also prepare input on the ERH and Thermal's VR system for the O&M Plan (up to 16 hours labor).

Thermal will revise the electrode detail drawing to produce an appropriate electrode completion for each of the 13 sub-areas (1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 2A, 2B, 2C, 2D and the degreaser region). Thermal will update the plot plan to include VR pipe sizing and location. This design work has been completed.

Subsurface Completion

Owner or Owner's agent will install 212 electrodes with co-located VR wells and 21 TMPs, as shown on the attached figure. Owner or Owner's agent supplies:

1. Drilling subcontractor, sand, bentonite and grout (grout is pure Portland cement).
2. Drilling supervision, including disposal of all drilling derived waste.
3. Plenum installation including asphalt cap with galvanized reinforcing grid, subsurface survey, location survey and spot marking of electrode drilling locations.
4. Permits as required.
5. CPVC pipe and well screen for the plenum with isolation valves at the surface.
6. Unloading and storage of subsurface materials.
7. Trenching and installation of subsurface piping within the Lockformer building.

Thermal supplies:

1. Steel shot and graphite.
2. Electrode elements (steel casing or plates), electrode cables, and electrode wetting system.
3. Well screen and casing for electrode VR wells.
4. Blank 3/4" CPVC pipe with bottom cap and thermocouples for TMPs.
5. Owner or Owner's agent unloads Thermal-supplied materials.
6. Thermal provides on-site electrode installation training and supervision for the first four days of drilling. Thermal will be available by telephone to answer questions during the remainder of the electrode installation.

Thermal will supply materials to treat the depth intervals based upon the exact surface conditions (i.e., depth of the Upper Silty Clay Till/Fill). Thermal's pricing for these materials is based on the electrode depths on Plate R-20 "ERH System Construction Details" (Dated 1-31-03) and the enclosed figure, both of which were provided by Clayton. From these documents, Thermal determined that 5,527 feet of electrodes will be placed and that the treatment volume will be 33,800 cubic yards. If the feet of electrodes to be placed, and thus the actual treatment volume, increases significantly (by more than 10%) than Thermal's costs to install additional feet of electrodes, as well as our estimates of the energy and time to complete the remediation, will need to be increased accordingly.

Surface completion

Owner or Owner's agent supplies:

1. Clear equipment compound (50 ft by 50 ft for TRS equipment, plus room as needed for GAC).
2. Remediation area or perimeter fence and a snow fence within the perimeter fence.
3. Telephone line to the power control unit (PCU).
4. Water line or hose connection (average use 2 gpm) to the TRS condenser.

5. GAC supply, transport, profiling, and regeneration.
6. Owner or Owner's agent will provide the connecting pipe from Thermal's VR system to the GAC vessels.
7. Piping and conduit installation from the electrodes and VR wells inside the building to the exterior of the building (wall or roof).
8. Heat tracing and insulation for the electrode wetting system.
9. Electrical connection to the Thermal's blower discharge heat exchanger.

The Owner will pay the ComEd connection fee (estimated at \$5-10k) and any electrician fee to connect 12-14 kV power to the input disconnect of Thermal's PCU.

Thermal supplies:

1. CPVC pipe, fittings, valves and installation from condenser to VR wells (1" to 8" diameter).
2. CPVC pipe and installation from condenser to the horizontal wells in plenum that have been installed by Clayton. This piping shall be installed above grade.
3. Piping and installation from the condenser to the VR blower and then to the VR blower discharge heat exchanger.
4. PCU and temperature monitoring system.
5. Condenser with cooling tower
6. 40 hp vacuum blower with noise enclosure.
7. Blower discharge heat exchanger.
8. Winterization for the condenser, VR blower, and heat exchanger as required.
9. Thermal will provide a crane to offload and place the above equipment.
10. All electrical connections (except the utility connection to the input disconnect of Thermal's PCU and the connection to the blower discharge heat exchanger).
11. Electrode wetting connections including water pumps, valves, and piping.
12. Testing of equipment interlocks.

Operations

Owner or Owner's agent:

1. Performs all vapor sampling (twice per week).
2. Performs condensate water sampling (if required).
3. Provides client reporting (as required in addition to Thermal).
4. Provides all soil sampling and analyses.

Owner pays for all electrical usage.

Thermal:

1. Operates and monitors heating and temperature monitoring systems (daily).
2. Provides daily (each work day) on-site system checks.
3. Makes major adjustments and repairs to the VR system.

4. Provides weekly operation status reports.
5. Provides site checks and voltage surveys (every two weeks).

Initial testing, shakedown, and start-up might require up to two weeks before Thermal indicates that routine operation has begun and begins counting operational days. The remediation is expected to require 163 to 200 days of ERH operation in order to reach the remedial goal.

The key to cost-effective remediation is to stop the heating of regions that have met the remediation goal and to concentrate efforts on the sub-areas that are still impacted. In order to provide the lowest overall remediation cost, Thermal recommends a general soil sampling approach that allows progress sampling to be performed over the course of the remediation. Thermal will work jointly with the Owner's agent to develop a sampling plan for the EPA that contains enough progress sampling to allow decisions to be made on what portions of the subsurface to continue heating and on the timing and scope of confirmatory sampling. In preparation of the sampling plan, it should be recognized that limiting downtime of the ERH system during of sampling events is important in pursuing the project goals.

Demobilization and Final Report

Thermal:

1. Removes abovegrade components that it supplied.
2. Summarizes heating and temperature data for a final report by Owner or Owner's agent.

Owner or Owner's agent:

1. Abandoning electrodes, VR wells, and TMP borings.
2. Site restoration activities other than removal of TRS equipment and above grade components installed by TRS.

From the time the power input to the subsurface is turned off, the vapor extraction system and condenser will remain operational for not more than 1 week, and will then be demobilized. Thermal will reconfigure the VR system to connect the VR piping to the blower discharge heat exchanger. Owner or Owner's agent will connect the outlet of the blower discharge heat exchanger to the inlet of one of the SVE system vapor-liquid separators. These changes will cause the blower discharge heat exchanger to act as a reduced capacity condenser and the condensate will be collected in the SVE system vapor-liquid separator. Owner or Owner's agent will assume all responsibility for operation and demobilization of the VR system after these modifications have been completed. No Thermal charges will apply to these continued operations by others. To accomplish this, the blower discharge heat exchanger will require an independent source of electrical power other than the electrical panel on the PCU.

After ERH remediation is complete the subsurface will slowly cool. The long period at elevated temperatures provides an important polishing step for further reduction in VOC concentrations by heat-enhanced bioremediation, hydrolysis, and dehalogenation by zero valent iron in the

Site Name: Lockformer Areas 1, 2, and degreaser

Electrical Resistance Heating Treatment Area: 38,092 sq. ft.
 Ave. Shallow Extent of ERH: 3.1 ft
 Ave. Deep Extent of ERH: 27.0 ft
 Typical Depth to Groundwater: 55 ft
 Treatment Volume: 33,800 cu yds
 Ave. Soil Organic Carbon Content: 0.70%



Based on provided TOC data:

Estimated Number of Electrodes: 212
 Estimated Ave. Distance Between Electrodes: 15 ft
 Ave. Total Depth of Electrodes: 26.1 ft
 Ave. Depth to Top of Electrodes: 5.0 ft
 Number of Temperature Monitoring Points: 21
 Estimated Number of Vapor Recovery Wells: 212

Installed in 12-inch o.d. borings.

TMPs average 5 thermocouples each.
 VR wells are co-located with electrodes.

Piping and Well Installation: Above grade
 Vapor Recovery Air Flow Rate (scfm): 460 scfm
 Vapor Extraction Blower: 40 horsepower
 Vapor Treatment Method: carbon

Supplied by Owner or Owner's Agent

Controlling Contaminant: TCE
 Average Clean-up Percent: 98.5%
 Maximum Expected Temperature: 90-95°C

E.g., reduce 667 mg/kg to 10 mg/kg
 Or slightly less due to applied vacuum.

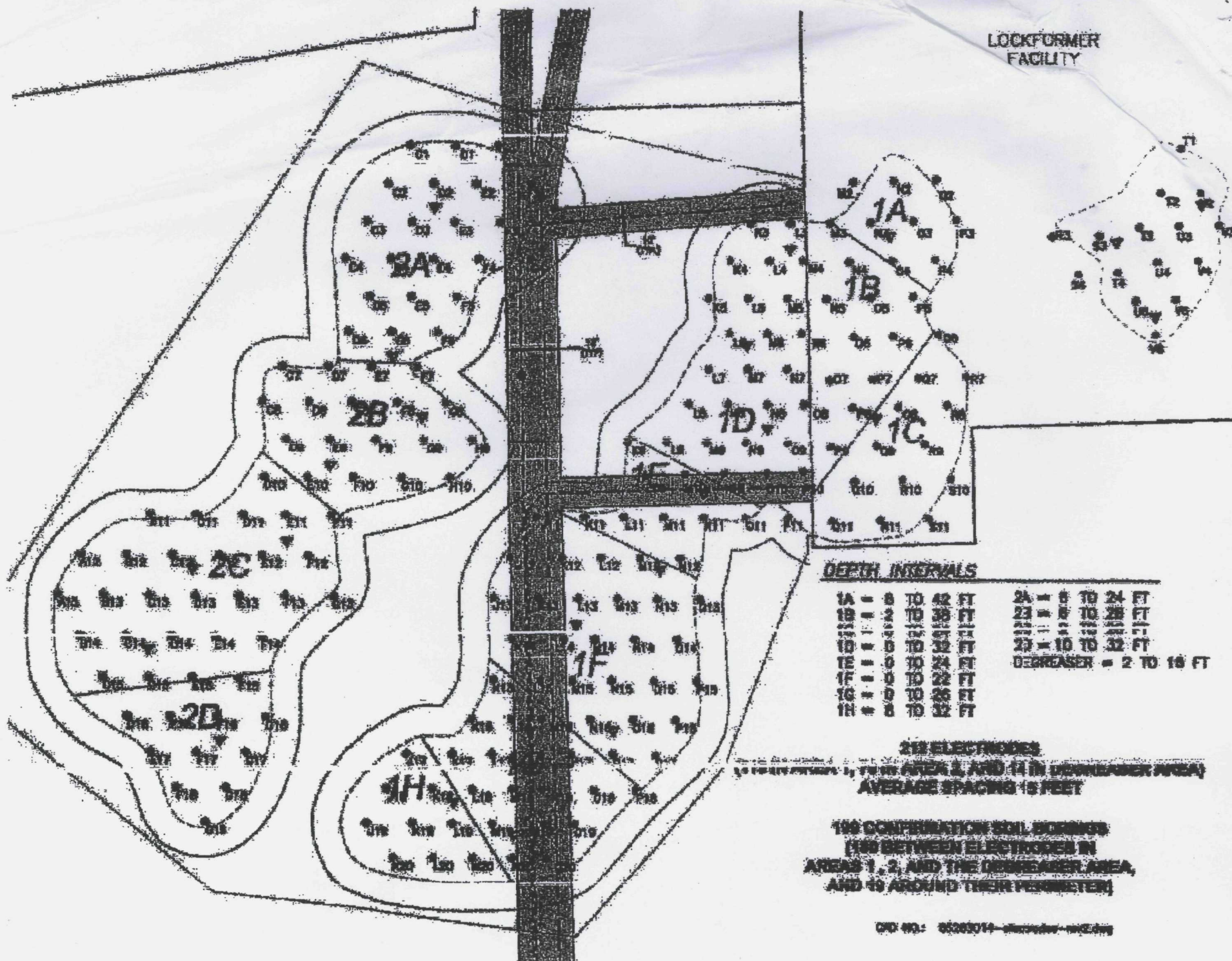
Average Electrical Heating Power Input: 1300 kW
 About one-half of the total region is actively heated at any time.
 Time to Heat-up first Section: 29 - 34 days
 Time to Boil First Section: 53 - 65 days
 Estimated Total Heating Treatment Time: 163 - 200 days
 Estimated Design Remediation Energy: 5,661,000 kW-hr
 Number of Confirmatory Soil Borings: 106

Installed by Owner or Owner's Agent

Costs

Thermal Remediation Services Costs	<u>fixed bid</u>
Design, Work Plans, Permits:	\$50,000
Remediation System Installation and Start-up:	\$770,000
Remediation System Operation:	\$656,000
Demobilization and Final Report:	\$127,000
Total Thermal Costs	\$1,603,000

TRS cost per cubic yard: \$47

LOCKFORMER
FACILITY

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